Name: _____ Date: _____

AP Chemistry / IB Chemistry 12(HL)

Regents Review Assignment

1. Add the following numbers and report the answer with the correct number of significant figures: 89.92 + 0.00460 + 620 + 8.753

2. Recall the formula for density. The mass of a certain object is 48.9 g. The object is a regular rectangular solid with dimensions of 5.9 cm, 4.2 cm and 11.8 cm. What is the density of this object with the correct number of significant figures?

3. State the difference between ionic and covalent bonds.

4. Draw the Lewis Dot structures and identify the shapes of the following molecules: Cl_2, CH_4, NF_3, H_2O

5. Write the chemical formula for the following compounds: aluminum chloride, sodium fluoride, magnesium oxide, calcium nitrate, iron (II) fluoride.

6. State the difference between mass number and atomic number and explain how to calculate the number of protons, electrons, and neutrons in a given atom.

7. Draw a Bohr Model of sodium showing where the protons, neutrons and electrons are. Write the electron configuration for sodium.

8. Identify each of the following:
   a) a noble gas with 36 protons in the nucleus
   b) a member of the same family as oxygen whose -2 ion contains 54 electrons
   c) an alkaline earth metal whose +2 ion contains 36 electrons
   d) a compound whose molecular mass is 18 and shows strong hydrogen bonding
   e) a strong binary acid that has a molecular mass of 36

9. Aspartame (Nutrasweet) is an artificial sweetener that is 160 times sweeter than sucrose (table sugar) when dissolved in water. The molecular formula of aspartame is $C_{14}H_{18}N_2O_5$.
   a) Calculate the molecular mass of aspartame
   b) How many moles are present in 7.29 grams of aspartame?
   c) What is the mass of 0.86 moles of aspartame?
   d) How many molecules are in 10.6 mg of aspartame?
   e) How many atoms of nitrogen are in 29.39 grams of aspartame?

10. The explosive thermite reaction has the following chemical reaction.

$$Fe_2O_3(s) + Al(s) \rightarrow Fe(l) + Al_2O_3(s)$$

   a) Balance this equation
   b) Is this a redox equation? Why or why not?
   c) How many grams of iron (III) oxide are needed to produce 71.8 grams of liquid iron according to this reaction?

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Limiting Reagent / Miners' Breakfast

You have just graduated from college and have become a breakfast cook for 600 miners in a northern mining town. (Good thing you spent all that money on an American Studies degree...) It is your job to keep these hungry miners fed. This means that the food had better be good and there had better be lots of it.

The basic breakfast menu consists of 2 eggs, 4 strips of bacon, a glass of orange juice and 2 pieces of toast. Let's write this as an 'equation'.

2 eggs + 4 bacon strips + 1 juice + 2 pieces of toast → 1 complete breakfast

The supplies in your kitchen are:

1. 500 dozen eggs
2. 95 sides of bacon (60 strips per side)
3. 370 liters of orange juice (your juice glasses each hold 300 mL)
4. 160 loaves of bread (20 slices of bread per loaf)

Questions: (Completed on a separate paper)

1. If you feed all 600 miners the first day, what supplies from the pantry do you use?
2. How much of each food type do you have left after day #1?
3. On the 2nd day, you make breakfast for all 600 miners again. How much of each food type do you have left after the 2nd day?
4. Which food type will run out first? This is the 'limiting reagent'. On which day will you run out of this food type?
5. How much of each food type do you have left when you run out of the 1st food? The remainder of foods are called the 'excess'.
6. What would be the size of the order that this cook would send through so that he would have enough supplies for 2 weeks? Use eggs in dozens, bacon in sides, orange juice in liters and bread in loaves.